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ABSTRACT

This guide presents instructions for five class sessions on the preparation of an energy education program by students to the community. The energy education program is designed around a series of booths or activity centers devised and operated by seventh-grade students and set up within the classroom. A list of sources for free or inexpensive materials is provided. (RE)

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ED175718

AN ENERGY ENCOUNTER

(AN ENERGY AWARENESS PROGRAM)

by LaVora Williams

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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SE 028 756

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For more information on this teacher's unit or others, contact:

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An Energy Encounter (An Energy Awareness Program)

GOAL:

After this unit, the 7th grade student will be able to successfully operate a variety of "Energy Awareness Day" Activity Centers.

SUGGESTED SUBJECT AREA AND GRADE:

Science, 7th grade

OBJECTIVE:

The student will choose to demonstrate his awareness of the importance of energy conservation by taking part in preparing and presenting the energy awareness program.

INTRODUCTORY CONTENT:

An Energy Encounter allows student involvement in the presentation of an educational program to give citizens an opportunity to learn more about energy problems and conservation opportunities. This is accomplished through a series of "booths" or activity centers devised and operated by students and set up within the classroom. One hour will be needed for each participant to be guided through these activities. The centers can remain open for the school day, enabling students to perform all the tasks involved in accommodating others attending -- parents, teachers, etc. The materials for this "Energy Encounter" are free or inexpensive but must be ordered in advance. Addresses are included.

"An Energy Encounter" sign will mark the classroom door. The students, designated as "Energy Enablers," will wear white tee shirts donated by a local business, possibly Sears, Roebuck and Company or the J. C. Penny Company, on which the words "Energy Encounter" or some other slogan or design agreed upon by the students has been "ironed on" or stenciled in textile paints. The student can complete his/her "uniform" by wearing blue jeans.

Parents, teachers and other classes will be invited. The price of admission - one aluminum can for recycling. This may motivate the class to launch a full-scale "recycling project" to collect materials; glass bottles, aluminum cans, newspapers, etc.

The participants will be met at the door by two "Energy Enablers" who will collect cans and distribute "Save Your Dollar Leaks - Save Energy" on which a color coded number is printed, designating the booth to be visited first. Upon completion of the activity or activities at that booth, the participant will visit the booths in numerical order until all have been completed.

The "booths" will be constructed around the walls of the classroom with the classroom desks or chairs arranged in the center. Colored numbers and signs with booth "name" must be made for each activity center. The "Power Posters" prepared in Unit II will be displayed along with other informational gathering devices including each student's "Personal Contract About the Energy Crisis." (Note: This is another unit.)

Following classroom discussion, the opportunities involved in preparing and running the "Energy Encounter" are assigned. Students should rotate jobs, performing all the activities as a reinforcement of classroom instruction.

EVALUATION:

Each student should participate in preparing and presenting the energy awareness program.

INSTRUCTIONAL PLAN

DAY 1

Purpose:

To reintroduce the subject of the energy crisis and set the stage for work on an "Energy Awareness Day" to be called "An Energy Encounter."

Activities:

1. The film, "Joey's World: Is It In Trouble?" will be shown and discussed to reintroduce the subject of the energy problem.

2. The teacher will distribute copies of the booklet "Energy Conservation Experiments You Can Do" (see resource list).

3. The students will be given five minutes to look over the material.

4. The teacher will spend ten minutes leading the classroom discussion of experiments #1 - Insulation, and #5 - Solar Heating.

5. The "Energy Awareness Day" and the "Energy Encounter" will be introduced.

6. The teacher will hand out tentative booth outlines for some of the "activity centers" listed in "Energy Encounter."

7. Class discussion of booth plans will follow.

8. Booth lists will be posted and students will be asked to add additional booth ideas and names.

9. Booth assignment sheets will be posted and students will be asked to sign up for specific booths.

10. General "Energy Encounter" committees will be designated and students will be asked to choose the committee on which they wish to serve.

    (a) Booth location committee
    (b) Booth number and names committee
    (c) Booth signs
    (d) Booth construction
    (e) Special materials committee
    (f) Publicity committee

DAY 2

Purpose:

The students will be designated as "Energy Enablers." "Energy Encounter" arrangements will be finalized.

Activities:

1. Teacher will designate students as "Energy Enablers" and assign two to each booth.

2. Duties and booth procedures will be discussed.

3. "Energy Enabler" uniforms of white tee shirts with appropriate lettering or design and blue jeans will be described.

4. White tee shirts will be distributed.

5. Tee shirt designs will be prepared. See appropriate attached design.

6. General committee appointments will be made.

An
Energy Encounter

DAY 3

Purpose:

"Energy Enablers" will collect and check all supplies needed for "Energy Encounter" Booths.

Activities:

1. All "Energy Encounter" booth activities will be reviewed. Teacher should check to make sure all "Energy Enablers" understand their assignments.

2. Publications to be distributed at each booth will be checked.

3. General committees will meet and specific work assignments begin.

DAY 4

Purpose:

Students will make final preparations for "Energy Encounter."

Activities:

1. Students will arrange classroom and construct booths for "An Energy Encounter."

2. Signs, booth numbers, publications for distribution, and materials for experiments and games will be placed at proper locations by the students.

3. Audio-visual equipment will be set up. The audio tape, "Simulated Energy Crisis Broadcast" (see resource list) and the slide presentation, "Energy Awareness" will be previewed.

DAY 5

Purpose:

Students will present "An Energy Encounter," and an educational "activity center" -- opportunities for citizens to learn more about energy problems and conservation.

Activities:

1. From 8 a.m. until 10 p.m., students will preview "Energy Encounter."

2. "Energy Enablers" will alternate operating the "Energy Encounter" booths from 10 a.m. until 11:30 a.m. and from 12:30 p.m. until 2 p.m.

3. From 2 p.m. until 3 p.m., booths will be dismantled.

EVALUATION:

Teacher observation of creativeness, scientific attitudes, and skills employed by the students in preparing and operating "Energy Encounter" booths, and evidence from individual and group discussions, will constitute evaluation. This process can be facilitated if the teacher will make a list of appropriate attitudes in advance, to use as a guide.

"AN ENERGY ENCOUNTER"

Booths or Activity Centers

An opportunity for citizens to learn more about energy problems and conservation in an "Activity Center" atmosphere.

Note: These booths make use of free materials. References and ordering information are given at the end of the unit.

BOOTH I

"Time is Running Out - So Time is Limited"

ACTIVITY:

What's your energy score?

ENERGY ENABLERS WILL:

Give each participant a copy of "Home Energy Savers' Workbook Quick Quiz." The participant, with the aid of a flashlight or a small birthday candle, will enter a large cardboard box "booth" and be allowed a predetermined time in which to answer "quick-quiz." The stored light energy from the flashlight or candle will last only a certain amount of time. The energy is limited. The answer sheet will be posted so that participants can check responses.

A QUICK QUIZ

Score

1. What is your thermostat setting?
If your thermostat is set at 68°F or less during daytime in winter, score 6 points; 5 points for 69°; 4 points for 70°. If your thermostat is set above 70°, score 0. ___

If you have whole-house air conditioning and you keep your temperature at 78° F in the summer, score 5 points; 4 points for 77°; 3 points for 76°. If you have no air conditioning, score 7 points. If your thermostat is set below 76°, score 0. ___

In winter, if you set your thermostat back to 60°F or less at night, score 10 points; 9 points for 61°; 8 points for 62°; 7 points for 63°; 6 points for 64°; 5 points for 65°. If your thermostat is set above 65° at night, score 0. ___

2. Is your house drafty?
To check for drafts, hold a flame (candle or match) about 1 inch from where windows and doors meet their frames.

If the flame doesn't move, there is no draft around your windows, and you score 10 points. If the flame moves, score 0. ___

If there is no draft around your doors, add 5 points. If there is a draft, score 0. ___

If you have a fireplace and keep the damper closed or block the air flow when it is not in use, add 4 points. ___

If you do not have a fireplace, add 4 points. ___

If you leave the damper open when the fireplace is not being used, score 0. ___

Score

3. How well is your attic insulated?
Check the map (p.3) to determine the inches of ceiling insulation recommended for your zone.

If you already have the recommended thickness of insulation, score 30 points. ___

If you have 2 inches less insulation than you should, score 25 points. ___

If you have 4 inches less insulation than you should, score 15 points. ___

If you have 6 inches less than you should, score 5 points. ___

If you have less than 2 inches of insulation in your attic, score 0. ___

4. Is your floor insulated?
If you have unheated space under your house and there is insulation under your floor, add 10 points; if there is no insulation, score 0. ___

If you have a heated or air conditioned basement or if there is no space under your house, score 10. ___

5. Do you have storm windows?
If you live in an area where the temperature frequently falls below 30°F in winter and you use storm windows, score 20 points. If you do not have storm windows, score 0. ___

Your Energy Quotient: Total ___

How well did you do?

BOOTH II

"Investigate and Insulate"

ACTIVITY:

How does insulation work?

HAND-OUT:

"Insulate for Comfort"

ENERGY ENABLERS WILL:

Explain how, in winter, a wall insulation slows down heat movement from inside to the cold outdoors. Heat flows from a warm object to cold air.

If a glass of water at room temperature is placed inside an ice chest the temperature of the water will drop quickly - probably 3° or 4° every five minutes. This illustrates that heat is flowing out of the warmer mass of water into the cold surrounding air.

Now we will show what happens when insulation is added:

Place a layer of cotton balls inside the bottom of a corrugated cardboard box and rest a glass of water at room temperature atop the layer of cotton. Pack the space between the glass and the sides of the box with cotton balls. Place a thermometer in the glass. Place the box inside the cold ice chest. The temperature drops more slowly - maybe a degree every five minutes.

The cotton insulation is slowing down the loss of heat from the mass of water in the glass.

Home insulation is not made of cotton, but probably of fiberglass, but it works much the same way.

DISPLAY:

Examples of home insula ing materials obtained from local insulation contractors - with characteristics of materials listed on charts.

The R value of the insulating materials should be noted and explained.

BOOTH III

"Meter Readers"

ACTIVITY:

How to monitor energy use

HAND-OUT:

"Your Electric Meter" - TVA

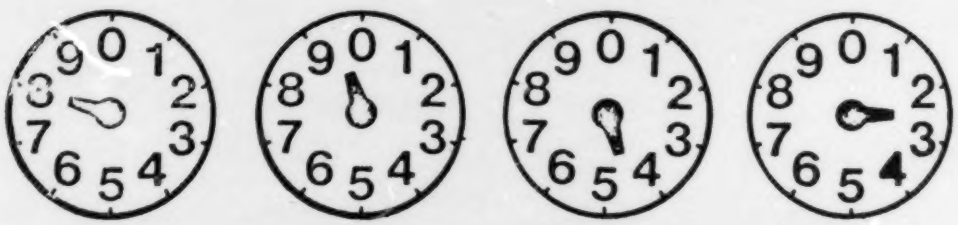
ENERGY ENABLERS WILL:

Use demonstration electrical meter dials to instruct the participants to read meters and interpret recorded data. These dials may be available from your local electric company. If not, make one from cardboard. Each participant will be given the attached information sheet to take home.

MEASURING HOME ENERGY USE
(Gas And Electricity)

1. Keeping an accurate record of gas and electrical consumption helps you know how much energy is being used in your home. To do this, read the gas and electric meters weekly and write down in your records the numbers on the dials. These records should be kept for two months.

   Electric meters measure the amount of electricity used in kilowatt hours. Meters have four or five dials numbered from 0-9. To read a dial, read the number at the end of the pointer. Note the dials as to whether they read clockwise or counter-clockwise. If the pointer is between two numbers, read the smaller number. Read the four meters and multiply by 10. (This is done by simply adding a 0 to the numbers.)



   The meter reading is 79,420 KWH.

   Gas meters are read in the same way, but you must remember that natural gas is measured in thousand cubic feet (MCF). After reading the meter, you must multiply by 1,000. (This is done by adding three 0's to the numbers. To find out how much you have used in one week or one month, you must subtract your first reading from your last reading).

2. In order to find out how much energy you are using at home, you must change KWH of electricity and MCF of natural gas into a common measurement. British Thermal Units (BTU) are the most common measurement of energy. In changing your KWH's and MCF's use the following formula:

   KWH of electricity x 3413 = BTU's of electricity
   MCF's of natural gas x 1030 = BTU's of gas

   Complete your chart and find out how many BTU's of energy your family is using a month in your home.

3. To measure how well your family is using energy in your home, follow the formula below. Measure the outside dimensions of your house and then find out how many square feet are in it.

Length of home	x	Width of home	x	Number of heated floors	=	Square feet in your home

BOOTH IV

"You Are There - Energy Crisis"

ACTIVITY:

Listen to the future

HAND-OUT:

"Our Energy Problems and Solutions"

ENERGY ENABLERS WILL:

Play taped radio broadcast of a "Simulated Energy Crisis" which places the participant in the "You Are There" role. This audio tape is entitled "Simulated Energy Crisis Broadcast" and can be obtained from the:

Mississippi Energy Extension Center
P. O. Box 5406
Mississippi State, Mississippi 39762

Additional copies may be made by students, and headsets used for participants.

BOOTH V

"Energy Games" or "The Energy - Environment Simulator"

ACTIVITY:

Make the fossil fuels last

ENERGY ENABLERS WILL:

Develop a variety of games using energy terms. Classroom chairs will be arranged in short rows - four chairs by four chairs - with cardboard "lap" boards on which games can be played. These "lap" boards will be squares of corrugated cardboard cut from boxes.

These "games" might include:

1. "Mystery Message" - copy attached
2. Scrambled "Energy Words" - copy attached
3. Bingo
4. Crossword puzzle

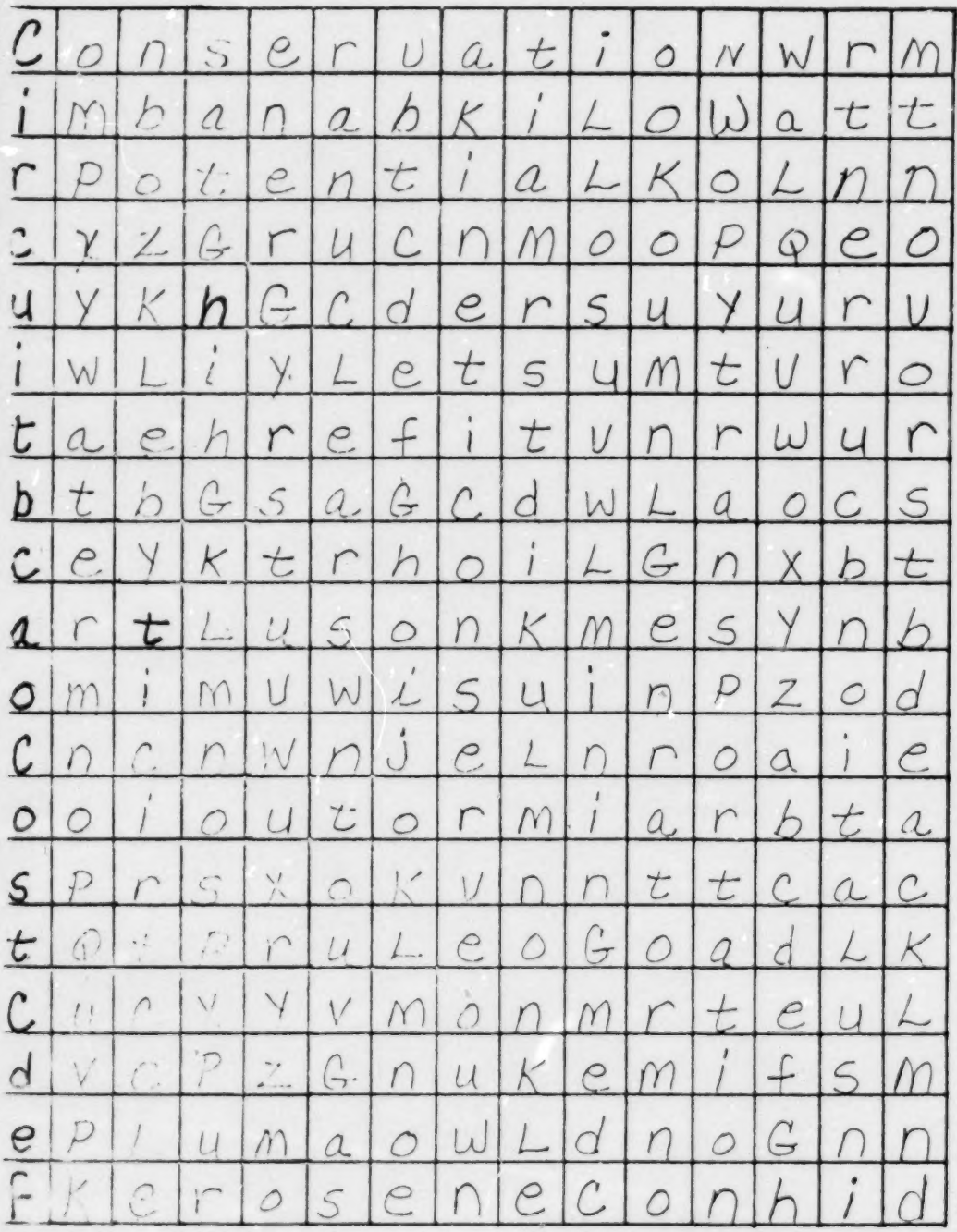
Prizes to be awarded are "Energy Dollars".

ALTERNATE ACTIVITY:

"The Energy - Environment Simulator" is a specially designed analog computer that simulates real-world conditions. Energy resources, energy demands, and environmental effects are programmed into the electronic device. As the clock speeds time by at the rate of a century a minute, decisions concerning the allocation of energy resources must be made by the participants. They do this by operating controls on remote panels in response to the changing situation. The simulator constantly translates these commands into new conditions. The sequence continues until the fossil fuels run out. (See resource list.)

SCRAMBLED ENERGY WORDS

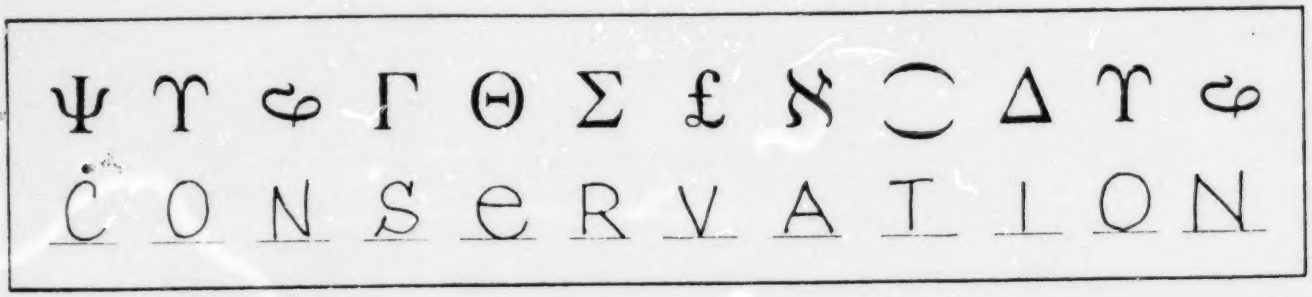
Find diagonally, up, down, across or backwards, and circle the following energy words.

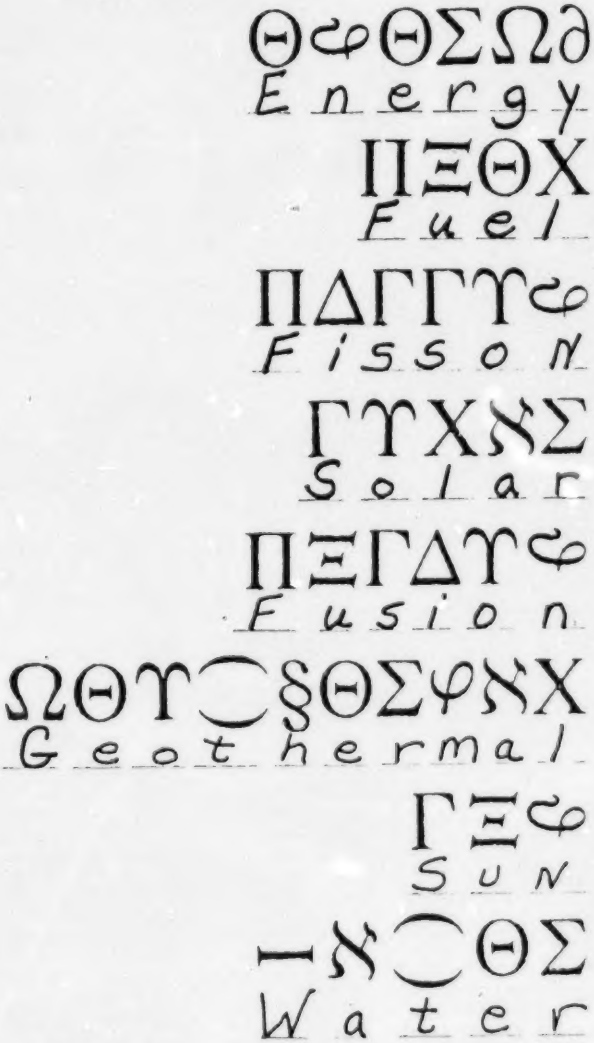


1. Conservation
2. Circuit
3. Current
4. Conserve
5. Generator
6. Energy
7. Kilowatt
8. Potential
9. Kinetic
10. Nuclear
11. Sun
12. Oil
13. Gas
14. Heat
15. Coal
16. Water
17. Kerosene
18. Electricity
19. Wood
20. Petroleum
21. Light
22. Insulation
23. Mining
24. Solar

cryptoglyphics

A famous archaeologist has discovered some hieroglyphics on an ancient tablet. He found a clue that told him the tablet was about conservation and the sources of energy. Can you figure out the words on the tablet?





BOOTH VI

"Energy Awareness"

ACTIVITY:

Learn energy facts

HAND-OUT:

Tips for Energy Savers

"7 Ways to Reduce Fuel Consumption in Household Heating"
Office of Consumer Affairs
Washington, DC 20506

ENERGY ENABLERS WILL:

Present a slide program dealing with the basic facts related to energy problems. Slides will be set up for viewing on a small screen, at student-viewing level.

BOOTH VII

"Recycling for Mississippi"

ACTIVITY:

Learn to use it again

HAND-OUT:

"Recycling for Mississippi"

ENERGY ENABLERS WILL:

Display addresses for collection centers for your area. Posters showing recycling "adventures" in the life of an aluminum can or a glass bottle can be displayed.

BOOTH VIII

"My School's Energy Concerns"

ACTIVITY:

Promote school conservation

HAND-OUT:

"Energy Conservation in Schools - What Citizens Should Know"

ENERGY ENABLERS WILL:

Explain energy conservation measures related to or resulting from the section entitled "Three Ways I Plan to Conserve Energy at School" from "My Very Own Contract About the Energy Crisis."

The following project will be developed and displayed:

Go back 100 years and list energy uses during a school day. Contrast this with the present school day.

BOOTH IX

"My Town's Energy Concerns"

ACTIVITY:

Promote community conservation

ENERGY ENABLERS WILL:

Display and discuss results of "Local Sources of Energy" section from the unit "My Very Own Contract About the Energy Crisis" in this booth.

Some of the following activities will be developed:

If gas rationing were implemented, and nine gallons per week per car were allocated, what would be the effect upon:

1. Unemployment?
2. Mass transit systems?
3. Attendance at sports events?
4. Sale of electric cars, bicycles?
5. Motel and hotel industry?

BOOTH X

"Free Energy" or

"Energy from the Sun is Free!"

ACTIVITY:

Consider a renewable energy source

HAND-OUT:

"Tips for Energy Savers"

Solar energy information from "contracts" can be displayed and an activity similar to this can be performed.

ENERGY ENABLERS WILL:

Build a cardboard "house for display." Tape a wrinkle-free plastic food wrap across the open top of a shoe box. Punch a small hole in one end of the box and slip a thermometer in. Put the box into a sunny window with the plastic front facing the sun and watch the thermometer. The temperature will climb as the sun heats the air inside the "house."

In a second box place a piece of cloth over the plastic window to simulate a curtain. The temperature in this "house" will climb slowly or not at all.

Explain that the sun will help heat homes in winter. When the sun shines, open the curtains for heat. At night or on a cloudy day, close curtains to reduce heat flow to the outside.

Available Resources - Free and Inexpensive Materials

Publications

Energy Conservation - Activities for the Classroom K-12
Kentucky Department of Education
Frankfort, KY

"Energy Conservation - Experiments You Can Do"
Thomas Alva Edison Foundation
Cambridge Office Plaza, Suite 143
18280 West Ten Mile Road
Southfield, MI 48075

Energy Conservation in the Home
University of Tennessee Environment Center
Knoxville, TN

"Energy Conservation in Schools - What Citizens Should Know"
Educational Facilities Laboratory
850 Third Avenue
New York, NY 10022

"Energy Dollars" #470-C
Cooperative Extension Service
P. O. Box 5406
Mississippi State, MS 39762

"Energy/Ecology/Economics"
Consumer Information Services
Sears Roebuck Company
D/703, Sears Tower
Chicago, IL 60684

"Home Energy Saver's Workbook"
Superintendent of Documents
U. S. Government Printing Office
Washington, DC 20402

"How to Save on Utilities"
"Save Your Dollar Leaks" #580
Cooperative Extension SErvice
P. O. Box 5406
Mississippi State, MS 39762

"Insulate for Comfort" #886
Cooperative Extension Service
P. O. Box 5406
Mississippi State, MS 39762

"Is Your Home Cold" #01018
Cooperative Extension Service
P. O. Box 5406
Mississippi State, MS 39762

"McDonald's Ecology Action Pack" 1974
McDonald's Corporation
Public Relations Manager
One McDonald's Plaza
Oak Brook, IL 60521

"Our Energy Problems and Solutions"
Shell Oil Company
P. O. Box 2463
Houston, TX 77001
Attn: Kitty Borah

"Recycling for Mississippi" #907
Cooperative Extension Service
P. O. Box 5406
Mississippi State, MS 39762

"Seven Ways to Reduce Fuel Consumption Through Energy Conservation"
Office of Consumer Affairs
Washington, DC 20506

"The Energy Primer"
Tennessee Valley Authority
Division of Power Utilization
Tupelo, MS 38801

"Tips for Energy Savers"
Energy Conservation Now
Pueblo, Colorado 81009

"101 Ways to Conserve Electricity at Home"
Commonwealth Edison
P. O. Box 767
Chicago, IL 60690

"Your Electric Meter and How to Read It"
Tennessee Valley Authority
Division of Power Utilization
Tupelo, MS 38801

Other Materials

"Energy Awareness" (Slide)
Mississippi Energy Extension Center
P. O. Box 5406
Mississippi State, MS 39762

"Energy - Environmental Simulator (Computer Game)
Mississippi Energy Extension Center
P. O. Box 5406
Mississippi State, MS 39762

"Joey's World: Is It in Trouble?" Level 4-12 (Film)
Pyramid Films
Santa Monica, CA

"Simulated Energy Crisis Broadcast" (Audio Tape)
Mississippi Energy Extension Center
P. O. Box 5406
Mississippi State, MS 39762

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